

Unit 10

Day 3 - Part 2

Finding Domain and Range Algebraically

Find the domain and range algebraically:

$$1) \quad f(x) = \frac{-5}{6+3x} \quad \begin{array}{l} 6+3x \neq 0 \\ 3x \neq -6 \\ x \neq -2 \end{array}$$

$$D: (-\infty, -2) \cup (-2, \infty)$$

$$3x: (-\infty, -6) \cup (-6, \infty)$$

$$6+3x: (-\infty, 0) \cup (0, \infty)$$

$$\frac{1}{6+3x}: (-\infty, 0) \cup (0, \infty)$$

$$\frac{-5}{6+3x}: (-\infty, 0) \cup (0, \infty) \leftarrow R$$

$$R: (-\infty, 0) \cup (0, \infty)$$

Find the domain and range algebraically:

2)

$$f(x) = \frac{4}{16 - x^2}$$

$$16 - x^2 \neq 0$$

$$\rightarrow x^2 \neq -16$$

$$x^2 \neq 16$$

$$x \neq \pm 4$$

~~16~~

$$D: (-\infty, -4) \cup (-4, 4) \cup (4, \infty)$$

$$x^2: [0, 16) \cup (16, \infty)$$

$$-x^2: (-\infty, -16) \cup (-16, 0]$$

$$16 - x^2: (-\infty, 0) \cup (0, 16]$$

$$\frac{1}{16 - x^2}: (-\infty, 0) \cup \left[\frac{1}{16}, \infty\right)$$

$$\frac{4}{16 - x^2}: (-\infty, 0) \cup \left[\frac{1}{4}, \infty\right)$$

$$R: (-\infty, 0) \cup \left[\frac{1}{4}, \infty\right)$$

Find the domain and range algebraically:

3) $f(x) = -|3x + 2| - 1$

$$D: (-\infty, \infty)$$

$$3x: (-\infty, \infty)$$

$$3x+2: (-\infty, \infty)$$

$$|3x+2|: [0, \infty)$$

$$-|3x+2|: (-\infty, 0]$$

$$-|3x+2|-1: (-\infty, -1] \quad R: (-\infty, -1]$$

Find the domain and range algebraically:

4) $f(x) = -\sqrt{x^2 - 4x - 5}$

Find the domain and range algebraically:

5)
$$f(x) = \frac{2}{x^2 - 3x + 2}$$

Find the domain and range algebraically:

$$6) \quad f(x) = \frac{2}{x^2 - 3x + 3}$$

(note - works out to be no restriction on domain)

Homework:

Domain and Range worksheet